Variable host cell viral affinity due to distinct and multiple number of HIV variants remains challenges in management and control of HIV/AIDS

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Human immunodeficiency Virus (HIV) binds different host cell receptors including human Mannose Receptor (hMR), DC-SIGN, Galactosyl Ceramide, Syndecan-Syndecan-3 Heparan Sulfate Proteoglycan receptors as well as immune cells. HIV is known to be sexually transmitted by binding to hMR on human sperm, vaginal epithelial which are devoid of conventional CD4 receptor. Localization of hMR was found to be in lower number of vaginal epithelial cells of HIV negative female partner of serodiscordant couples as compared to normal females suggesting association of hMR in sexual transmission of HIV. Additionally poor proof reading activity HIV results in to presence of distinct and multiple DNA and RNA variants in different cells and secretions of the same individual. Genotypic and phenotypic characterization of C2-V3 region of HIV1 C *env* gene in PBMCs, sperm, vaginal epithelial cells and cervical cells showed presence of distinct variants in the same individual with variable infectivity with different numbers of N-linked glycosylation (NLG) sites suggesting variation in coreceptor affinity in different cells of same individual which may influence disease progression and risk of HIV transmission. Additionally genotypic characterization of HIV1 gp41 by next generation sequencing showed presence of multiple variants in blood of the same individual. Presence of distinct and multiple variants in different cells and secretions may influence the viral affinity to host and immune cells and therefore may affect HIV transmission, infectivity, response to antiretroviral drug therapy and pathogenicity. Presence of cell associated DNA virus and cell free RNA virus suggests the need for development of effective vaccine which elicit both cell mediated as well as humeral; immune responses. Also development of formulation for prevention of sexual transmission of HIV need to be primarily prevent HIV binding to hMR, CXCR4 and CCR5 coreceptor which may be safe microbicide for prevention of HIV transmission.

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